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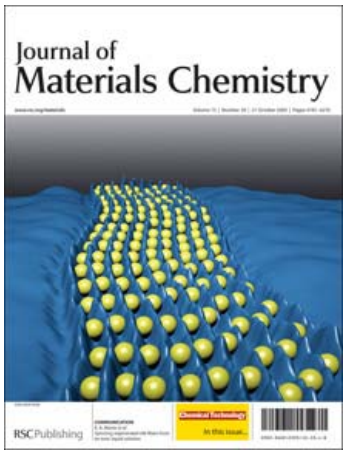
Research summary:



Our current research focuses on investigations that develop understanding of complex nanoscale processes on surfaces. We aim to decipher and exploit the forces that govern both natural and directed hierarchical self-assembly to create technologically significant surface architectures incorporating electronically or magnetically active materials. Recent studies have included using lithographic patterning to guide the alignment of block copolymer domains and the self-organization of FePt and CdSe nanoparticles on nanostructured polymer films. We are exploring extensions of this methodology into areas such as biomaterials and photoresponsive hybrid nanocomposites.

Selected recent publications:

"Mechanism for hierarchical self-assembly of nanoparticles on scaffolds derived from block copolymers," S.B. Darling, *Surf. Sci.* In Press.

"A materials chemistry perspective on nanomagnetism," S.B. Darling and S.D. Bader, *J. Mater. Chem.* **15** 4189-4195 (2005). [Invited, Cover Story]

"Self-organization of FePt nanoparticles on photochemically modified diblock copolymer templates," S.B. Darling, N.A. Yufa, A.L. Cisse, S.D. Bader, and S.J. Sibener, *Adv. Mater*. **17** 2446-2450 (2005).

"Guiding polymers to perfection: Macroscopic alignment of nanoscale domains," D. Sundrani, S.B. Darling, and S.J. Sibener, *Nano Letters* **4** 273-276 (2004).

"Hierarchical assembly and compliance of nanoscale polymer domains in confinement," D. Sundrani, S.B. Darling, and S.J. Sibener, *Langmuir* **20** 5091-5099 (2004). [Cover Story]